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Racial Differences in Breast Cancer Screening Behaviors and Beliefs in Urban Public School Teachers

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Racial Differences in Breast Cancer Screening Behaviors and Beliefs in Urban Public School Teachers

FINAL REPORT

ABSTRACT

Breast cancer is the leading cause of cancer mortality in African-American women. Studies have reported that African-American women with breast cancer are more likely to be diagnosed at a later stage of the disease and have a higher mortality rate than White women. Despite this, African-American women are less likely than White women to avail themselves of the benefits of screening mammography. This is most often attributed to lack of education, lack of access, and low socioeconomic status. However, it has been repeatedly shown that when socioeconomic, educational, and logistic barriers are minimized, African-Americans continue to underutilize these screening procedures. In this study, breast cancer screening behaviors and the factors that influence those behaviors were measured by means of a survey questionnaire distributed to members of a defined population of African-American and White women with potentially comparable levels of education, health care access, and socioeconomic status. This report describes the background, objectives, and procedures of this study, and details the work carried out in Year 02, including data collection and analysis. A total of 782 usable surveys were returned from female public school teachers in Philadelphia aged 40 and older. White respondents were more likely than African-Americans to be married or cohabiting, and had significantly higher annual household incomes; they were also more likely to have been adherent to mammography guidelines over the previous five years and to say that they would definitely get a mammogram in the next 24 months. African-Americans, by contrast, were more likely than Whites to have practiced regular breast self-examination. When demographic and health-related factors were controlled for, however, no significant effect of race on mammography adherence or intentions was found.

FOREWORD

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Racial Differences in Breast Cancer Screening Behaviors and Beliefs in Urban Public School Teachers

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INTRODUCTION

A. Overview

Breast cancer is the leading cause of cancer mortality in African-American women (Boring, Squires & Heath, 1992). Studies in the United States in the last twenty years have reported that African-American women with breast cancer have a higher mortality rate than White women. In addition, African-American women are more likely to be diagnosed at a later stage of the disease than White women. Although recent (1989-92) mortality data from the National Cancer Institute Surveillance Program (National Center for Health Statistics, 1995) on breast cancer indicates a decrease for White women (-5.5%), the data show an increase in mortality for African-American women (+2.6%). The reasons for this difference are not entirely clear. Studies of breast cancer and race have conflicting results. Some studies of breast cancer incidence and mortality, which correct for socioeconomic factors, continue to show a discrepancy in data between White women and African-American women. Some studies have speculated there are differences between the races in adherence to screening guidelines, access to health care, and immediacy of diagnoses in the face of symptoms. And certain studies postulate biological differences such as types of tumor biology (Elledge, Clark, Chamness & Osborne, 1994) as the cause of mortality rate discrepancy between African-American and White women.

Unfortunately, researchers and health care professionals do not understand completely all the risk factors involved in the etiology of breast cancer. Early detection of the disease currently offers the most effective breast cancer control, and efforts rely on routine screening mammograms, clinical breast exams, and breast self-examination. A number of national and international studies offer convincing evidence that regular screening mammograms for women 50 years and older lead to a reduction in breast cancer mortality (Shapiro, Venet, Strax, Venet & Roeser, 1982). Despite this information, screening mammography is not widely utilized and African-American women are less likely than White women to avail themselves of the benefits of screening mammography. This is most often attributed to lack of education, lack of access, and low socioeconomic status. However, the issue of racial differences in breast cancer is not solely confined to the poor. It has been repeatedly shown that when socioeconomic, educational, and logistic barriers are minimized, African-Americans continue to underutilize these screening procedures (Michielutte & Diseker, 1982).

This study was undertaken to better understand the differences between African-American and White women in breast cancer screening behaviors and the beliefs that influence those behaviors. In addition, this study examined factors that influenced these women to undergo breast cancer screening. This study selected a defined, representative population of similar education, health care access and socioeconomic status. Data was collected through a questionnaire distributed to study participants.

The study population is composed of female teachers (members of the Philadelphia Federation of Teachers union) over the age of 40 from the School District of Philadelphia. Approximately 37% of these 6,700 teachers are African-American. The screening behaviors and beliefs of this group provide insight into the differences in breast cancer screening behaviors between African-American and White women. The results of this study can lead to the development of intervention programs for improvement in adherence to the accepted screening guidelines.

B. Background and Significance

Racial differences in breast cancer incidence, mortality and survival

Breast cancer is a growing problem in the United States. Nationally, the incidence has increased approximately 1% per year since the early 1970s, rising from 82.4 per 100,000 women to 108.8 cases per 100,000 women in 1990 (Hankey, Brinton, Kessler & Abrams, 1993). The American Cancer Society estimates there will be 183,400 new breast cancer cases in 1995, and 46,240 deaths from the disease. Statistics related to breast cancer incidence, mortality, and survival reveal the disparity between African-Americans and the White population. Incidence of breast cancer has increased in both the White and African-American female population, although at a higher rate among White women (Hankey et al., 1993). The increase in the 1980s, in large part, appears to be due to increases in early detection and use of mammography (Miller, Feuer & Hankey, 1991; Feuer & Wun, 1992; Swanson, Ragheb, Lin et al., 1993). The mortality rate during that same period of time shows a greater increase for African-Americans. In 1973, White women suffered 27.1 deaths per 100,000 women. In 1990 the rate was 27.4 deaths per 100,000 women. By contrast, the mortality rate among African-American women increased from 26.3 deaths per 100,000 women in 1973 to 31.7 per 100,000 in 1990 (Hankey et al., 1993). Recent (1989-92) mortality data from the National Cancer Institute Surveillance Program (National Center for Health Statistics, 1995) on breast cancer indicate a decrease for White women (-5.5%), with a continued increase in mortality for African-American women (+2.6%). Similar disparity is seen locally with average annual age-adjusted incidence in Pennsylvania for 1988-1992 of 118.9/100,000 for Whites and 107.6/100,000 for African-Americans. The mortality rates were 29.1/100,000 for White and 34.5/100,000 for African-Americans (Pennsylvania Cancer Registry, 1994).

A disturbing difference in survival rates for African-American and White women has been apparent in the United States since the 1950s (Chen, Trapido & Davis, 1994). Survival for African-Americans remains poor relative to that for Whites, with a 5-year survival of only 62% compared with 80% for Whites (Sondik, 1994). In 1983 the National Cancer Institute planned and funded the Black/White Cancer Survival Study in an effort to determine reasons for the disparity in survival between African-American and White women with breast cancer. Approximately 40% of the difference in survival was explained by more advanced disease at the time of detection and another 15% was explained by histological/pathological differences. Sociodemographic variables appeared to act largely through racial differences in stage at diagnosis (Eley, Hill, Chen et al., 1994).

Stage of the disease is the single best predictor of survival. African-American women are diagnosed with a more advanced stage of disease and have a poorer prognosis (National Cancer Institute, 1991). In Pennsylvania almost 31 percent (White 30.6%, African-American 35.4%) of females were diagnosed at the regional or distant stages of the disease in 1992. Five-year survival rates are poor at these stages (Pennsylvania Cancer Registry). Chen et al. (1994) reported a significant increase in the percentage of early stage diagnoses of breast cancer during 1981-1989; however, the percentage of early stage diagnoses (in situ and local stage) was significantly lower among African-Americans than among Whites. The SEER data reveal that in 1990 only 29.8% of all breast cancers detected in African-American women were Stage I whereas in White women the percentage was 42.5% (Hankey et al., 1993).

Although racial differences in both clinical stage at diagnosis and in survival are related to socioeconomic status, the issue of racial differences in breast cancer is not solely confined to the African-American poor (Freeman & Wasfie, 1989). Studies have shown that the differences between African-Americans and Whites persist to varying degrees regardless of their socioeconomic status. Despite African-Americans' economic progress in the last three decades, they experience a continued increase in mortality from breast cancer.

Racial discrepancies in breast cancer screening behavior

Early detection of the disease currently offers the most effective breast cancer control since to date no proven technologies are available to reduce breast cancer incidence. However, studies have shown that, compared to their White cohort, African-American women utilize screening methods for breast cancer less often (Horton, Romans & Cruess, 1992). The 1987 National Health Interview Survey (National Center for Health Statistics, 1987) indicated that only 36% of women age 40 and older had ever received a clinical breast examination and mammography (38% for White women and 28% for African-American women). With increased publicity, the number of women 40 and older who have ever had a mammogram has increased. The Mammography Attitudes and Usage Study (Horton et al., 1992) shows an increase in the usage of mammography in the White population from the 1990 survey to the 1992 survey (65% to 76%). However, there was no significant increase in the usage in the African-American population (58% to 59%).

Factors influencing the utilization of mammography among African-Americans

The majority of studies have cited low socioeconomic status combined with poor knowledge of and access to health care, lack of physician recommendation and negative psychological belief systems about cancer as the major factors that negatively impact African-Americans in their utilization of cancer screening tests.

Socioeconomic factors. Real or perceived lack of access to health care and the barriers of limited or no insurance coverage which would provide access to screening procedures are actual deterrents for disadvantaged women. For women who do not have a primary care physician and who usually obtain their health care through emergency rooms and clinics for specific acute or

chronic illnesses, there is little opportunity for longitudinal care or disease prevention/health promotion activity and education.

The role of physicians. Lack of physician referral is consistently cited by high numbers of women as the reason for not obtaining a mammogram. The data suggest that mammography is not widely recommended in asymptomatic women. One study (Bloom, Grazier, Hodge & Hays, 1991) cited that only 38.8% of women over 50 recall ever being given this recommendation. When it is recommended, there was a high compliance rate (87%). Other studies report racial variations in recommending screening mammography. Gemson, Elinson, and Messeri (1988) showed that only 7% of physicians with predominately African-American and Hispanic patients recommended screening mammography as opposed to 23% of physicians with predominately White patients. Caplan, Wells, and Haynes (1992) found that African-Americans were more likely than Whites to cite lack of recommendation as the most important reason for not having a mammogram.

Negative belief systems. When the barriers of socioeconomic and lack of physician prompting are minimized, African-Americans continue to underutilize these screening procedures (National Center for Health Statistics, 1987; Rimer, Keintz, Kessler, Engstrom & Rosan, 1989). This suggests that negative health beliefs, such as fear of finding a positive result, fatalism, denial of the risk of cancer and other psychological barriers also contribute to racial differences in breast cancer screening behavior. Burack and Liang (1987), studying a predominantly African-American population, found the most commonly cited barrier to be fear of finding something wrong. Bloom, Hayes, Saunders, and Flatt (1987) also cited fear of cancer as a major barrier to cancer screening among African-Americans, and Fox and Stein (1991) found that African-Americans were more likely than Whites to report fear of cancer as a barrier. Strong fatalistic attitudes in the African-American community toward cancer and cancer treatment have been noted by various researchers (Bloom et al., 1987; Price, Desmond, Slenker, Smith & Stewart, 1992); such attitudes have been offered as a possible explanation for the fact that, among African-Americans, those who perceive themselves to be at high risk of cancer are often less likely to obtain screening (Bloom et al., 1987; Bloom et al., 1991). Fatalism may also manifest itself in psychological avoidance of the threat of cancer. Burack and Liang (1987), for example, found that African-American women tend to place the threat of breast cancer as a lower present or future concern, in contrast to the beliefs of White women who consider breast cancer as the most worrying illness to which women are prone. Other psychological barriers that have been found to be more common among African-Americans than Whites include concerns about pain and radiation (Fox & Stein, 1991).

Advantages of studying middle and upper socioeconomic status African-Americans

Most studies of knowledge, beliefs, and behaviors of African-Americans concerning breast cancer and mammography have drawn subjects largely or exclusively from disadvantaged subpopulations (Bloom et al., 1987; Bloom et al., 1991; Price et al., 1992; Hunter et al., 1993). Nationwide, one-third of African-Americans are below the poverty level (US Census Bureau); however, there is a growing segment of improved economic status in the African-American community. The importance of understanding health behaviors of individuals with low

socioeconomic status (SES) is beyond question. There is also value, however, in studying African-Americans who are of middle and upper SES. From a practical standpoint, high-SES individuals tend to be accessible and open to change, and also tend to serve as role models; thus, they may serve as ideal agents of change in the African-American community. Vogel and Batiste (1992) found increased participation in a screening program by using community leaders to identify, recruit, and educate their peers about breast health. Other successful model programs utilizing African-American to work effectively in education of African-Americans have been reported (Frank-Stromborg, Johnson & McCorkle, 1987; Erwin, Spatz & Turturro, 1992). From a theoretical perspective, studies of middle and upper SES African-Americans can provide valuable information about knowledge, beliefs, values, and practices among a segment of the African-American population that has heretofore received relatively little attention in the research literature.

Beyond this, examination of middle and upper SES African-Americans should provide useful information regarding the issue of racial differences in mammography behavior. Studies have shown mammography rates among African-Americans lagging behind Whites (Jepson, Kessler, Portnoy & Gibbs, 1991; Vernon, Vogel, Halabi, Jackson, Lundy & Peters, 1992; Horton et al., 1992). Identifying the reasons for this gap, however, is no simple task. African-Americans and Whites, even if they are living in the same general geographical area, tend, to a greater or lesser extent, to form distinct subpopulations that differ in a multitude of ways. Some of these differences are objective and obvious, such as differences in income, while others are intangible and subtle, such as differences in values, cultural beliefs, and perceptions of real or perceived barriers. Identifying the factors responsible for racial differences in behavior is complex. However, the difficulty of this task might be reduced if a study could be done on a naturally-occurring, defined population containing both African-Americans and Whites, in which the nature of the population membership criteria tended to insure comparability between the African-American and White segments on major socioeconomic factors such as income and education. Even better would be if the population were uniform in terms of health care access. Any differences in mammography behavior between African-Americans and Whites in such a population would then presumably be due largely or entirely to those intangible cultural differences between the races. The project described herein examined such a population -- public school teachers aged 40 years and over in the School District of Philadelphia.

C. Previous studies

1. Black-White Differences in Cancer Prevention Knowledge and Behavior (Christopher Jepson, Larry G. Kessler, Barry Portnoy, and Tyson Gibbs)

This study was an analysis of data from the 1987 National Health Interview Survey Cancer Control Supplement. Among African-American women aged 40 and over ($n = 907$), 31.2% reported that they had ever had a mammogram, as compared to 40.0% of White women ($n = 5524$; OR = 0.68, 95% C.I. = (0.57, 0.81)). A logistic regression model of mammography utilization was estimated in which the predictors were race, age, income, education, and a set of variables representing knowledge and beliefs about various aspects of cancer and cancer

prevention. With these factors controlled, the difference between African-Americans and Whites in mammography behavior was eliminated.

2. Determinants of Mammography Intentions among Prior Screenees and Non-Screenees (Christopher Jepson and Barbara K. Rimer)

This study examined whether the factors influencing a woman's intention to have a mammogram differ for women who have had mammograms in the past (prior screenees) and for those who have not (prior non-screenees). The sample consisted of 405 asymptomatic women aged 50 to 74; 162 of these were prior screenees and 243 were prior non-screenees. Subjects participated in a survey in which they were asked about their intentions to have a mammogram in the future. A number of other survey items were identified, a priori, as potential predictors of intentions. This set of items was used to predict intentions separately among screenees and non-screenees. For each group, these variables were entered into a linear regression model of intention, and backward elimination was used to remove variables not contributing significantly. Among prior non-screenees, the final model was highly predictive of intention, explaining nearly half of the variance ($F = 18.35$, $p < .0001$, $R^2 = .46$). Among prior screenees, by contrast, the final model explained only about one-seventh of the variance in intention ($F = 10.69$, $p < .0001$, $R^2 = .14$). Thus, at least with respect to intentions, there do appear to be substantial differences in the factors influencing prior screenees and non-screenees.

3. Determinants of Repeat Adherence to Screening Mammograms (Christopher Jepson)

This project consisted of two pilot studies for the purpose of testing materials and procedures for future research. In the first study, asymptomatic women aged 50 and over who were about to receive their first screening mammogram participated in two interviews, before and after the mammogram. In the second study, women who had had their first screening mammogram approximately 21 months previously participated in a single interview.

In Study 1, a total of 29 respondents completed both interviews. Among these respondents, 38% reported significant anxiety during the mammogram; 34% reported significant physical discomfort; 14% reported significant inconvenience; and 21% reported significant embarrassment. 48% said they definitely would get another mammogram next year; another 31% said they probably would, and 17% were unsure. Only one respondent said she probably would not.

In Study 2, a total of 155 respondents were recruited, of whom 51% had had another mammogram since their first one. Among those who had not, the percentages agreeing with various reasons for not getting another mammogram were as follows: Anxiety, 14%; pain, 8%; inconvenience, 27%; embarrassment, 8%; cost, 9%; concern about radiation, 25%; belief that annual mammograms are unnecessary, 13%; lack of recommendation or reminder, 8%; "I'd rather not think about it," 26%; and "I've simply never thought about it until now," 49%.

In summary, repeat adherence appears to be a problem in the population studied, and aversive experiences are reported by a substantial fraction of respondents.

D. Hypothesis and Objectives

The central hypothesis of this study was that in a population of women of comparable socioeconomic and educational background the African-American women would report lower rates of mammography utilization than White women. An auxiliary hypothesis was that this discrepancy would be at least partially accounted for by differences in social and psychological factors such as knowledge, beliefs, and social norms. Due to the lack of prior research on this population, however, no hypotheses were proposed concerning which specific variables would be important; the analyses addressing this question were exploratory in nature.

The objectives of this study were as follows:

- (a) To recruit and survey a randomly selected sample of African-American and White female teachers aged 40 and over from the School District of Philadelphia;
- (b) To describe knowledge, attitudes, and practices related to breast cancer and mammography in this sample;
- (c) To compare rates of mammography among African-American and White women of comparable socioeconomic status and health care access; and
- (d) To explore possible reasons for any racial differences in behavior.

E. List of individuals receiving pay from project

Elizabeth Patterson	Principal Investigator
Christopher Jepson	Co-Investigator
Ann-Marie Walsh-Brennan	Project Manager
Nancy Hodgson	Research Assistant
Jean Rodwell	Research Assistant

BODY

A. Methods

Subjects

The study population was composed of female teachers aged 40 and over from the School District of Philadelphia. Participants were selected specifically from the Philadelphia Federation of Teachers union (PFT). This population consists of approximately 6700 individuals, of whom approximately 37% are African-American.

Procedures

Prior to the start of data collection, a list was generated by the PFT containing the name, address, and telephone number of each member of the population defined in the previous section. From this list, a sample of 1996 individuals was randomly selected. The PFT sent a letter to each individual in this sample, informing them of the study and urging them to participate.

At the start of Year 02, a package of materials (Mailing 1) was mailed to each individual in the sample, containing the following items:

- (a) A cover letter describing the study and asking the individual to participate;
- (b) The study questionnaire, including the Consent Form as its first page;
- (c) A second copy of the Consent Form for the respondent to keep;
- (d) A postage-paid return envelope.

Copies of the cover letter, Consent Form, and questionnaire are found in Appendices A, B, and C.

As each completed questionnaire was received, it was logged in. Several weeks after Mailing 1, reminder telephone calls were made to all individuals from whom a completed questionnaire had not yet been received. Their purpose was to answer any questions the individual might have, to provide reassurance, and to explain the importance of every individual's participation. If the individual agreed to participate but had discarded her package, another was sent.

Telephone calls were also made to any respondent who returned a completed consent form but whose questionnaire was filled out incompletely or incorrectly. The respondent was asked about the items in question, and if possible, valid responses were elicited. Also at this time phone numbers which were not valid were checked against the PFT records to update any changes.

Approximately three months later telephone calls were again made to all individuals who had not responded to the first phase of phone calls or to the second mailed questionnaire. If the individual agreed to participate but had misplaced her questionnaire, another was sent.

For all individuals in the sample who did not complete a questionnaire, the final disposition of the telephone calls was recorded (e.g., refused, no answer).

Materials

The constructs measured by the questionnaire are described below.

Medical history. Respondents were asked if they have ever had breast cancer or any breast problems that required an office visit with a surgeon or other medical procedures. Respondents who answered "yes" to either question were not excluded from participation; however, respondents who had had breast cancer skipped certain parts of the questionnaire and their data were analyzed separately. Respondents were also asked if they had ever had any other kind of cancer.

Health beliefs. Perceived susceptibility to breast cancer, perceived seriousness of breast cancer, and perceived benefits of mammography were measured using scales developed by Champion (1991). Several additional items measuring perceived benefits and barriers were also included.

Mammography experiences were measured by a set of items asking the extent to which the respondent experienced the following in connection with her most recent mammogram: anxiety; inconvenience; physical discomfort; and other problems.

Reasons for not having a mammogram. Respondents who had not had a mammogram within the past 24 months were asked a set of questions concerning the reasons why they had not done so.

Subjective norms were measured for three sources: the respondent's doctor, family, and friends. Items followed the format suggested by Ajzen and Fishbein (1980).

Knowledge. Although several knowledge scales have been developed focusing on breast self-examination (Champion, 1991; McCance, Mooney, Smith & Field, 1990), no established scale specifically measuring knowledge of breast cancer and mammography and displaying adequate psychometric properties was found in the literature. A set of individual items taken from the work of various researchers, chosen to cover the major areas of knowledge that have been examined in the literature about breast cancer and mammography, was included.

Demographics. A set of standard demographic items (age, ethnicity, education, marital status, and annual family income) was included.

Breast cancer in family and friends. Respondents are asked whether anyone close to them had ever had breast cancer.

Provider variables. Items measuring respondents' contact with the health care system (e.g., regular physician, receipt of mammography reminders or recommendations) were included.

Screening history and intentions. The following questions were asked: (a) How long ago was your most recent mammogram (0-1 year ago, 1-2 years, over 2 years, never); (b) How many mammograms have you had in the last five years?; (c) Where did you obtain your most recent mammogram?; (e) Do you intend to have a mammogram in the next 24 months? In addition, questions about clinical breast examinations and breast self-examination practices were included.

Data Analysis

Analyses were carried out using the SPSS-PC statistical package. The percentage of individuals in the sample who completed the survey, and the percentages in the various categories of non-completion, were calculated for the combined sample. Descriptive statistics for all measures included in the interview, including reliability of multi-item scales, were also calculated.

The central analysis of the study was the determination of whether African-Americans and Whites differed significantly on any of the outcome variables (recency of last mammogram, frequency of mammograms, and intentions). However, differences between African-Americans and Whites on all other measures were also examined. In addition, the bivariate relationship of each predictor variable to the outcome variables was examined in the combined sample and for African-Americans and Whites separately.

For each outcome variable, an exploratory multivariate analysis was conducted, for the purpose of examining factors that might account for the difference. This analysis proceeded in two stages. In the first stage, a logistic regression model of each outcome variable was developed in which the potential predictors consisted of all variables other than race that displayed a significant bivariate association with that outcome variable in the combined sample. Predictor variables were entered into each model using a forward stepwise procedure. In the second stage of the analysis, variables contributing significantly to the first-stage model were entered as a block into another logistic regression, followed by race.

Year 01 Accomplishments

1. Meeting with PFT

Drs. Patterson and Jepson met with representatives of the Philadelphia Federation of Teachers (PFT) to discuss procedures for the study. The PFT provided us with a list of the names, addresses, telephone numbers, and Social Security numbers of all female teachers aged 40 and over; the list contained 6741 names. They agreed to send out a mass mailing to all the teachers we selected from the list, consisting of a letter describing the study and urging members to participate.

2. Meeting with School District

Dr. Patterson met with representatives of the Philadelphia School District. They agreed to send out a letter to all school principals informing them of the study and indicating the District's endorsement thereof.

3. Pilot testing

In June 1997, Drs. Patterson and Jepson carried out a pilot test of the survey questionnaire at University City High School. The first step was to secure the approval and cooperation of the school principal and building representative. A time and place for the pilot test was arranged, and a letter of invitation was placed in the school mailbox of all female teachers aged 40 and over, asking them to participate. A total of sixteen teachers participated. Four additional teachers, recruited through personal contact with Dr. Jepson, also completed the survey instrument, bringing the total number of pilot respondents to 20.

The time needed by each respondent to complete the survey was measured; most respondents needed between 10 and 20 minutes, slightly less than expected. No respondents expressed any significant problems with the survey, although a few made suggestions for minor revisions. Drs. Patterson and Jepson reviewed all completed surveys, and based on this, a number of minor revisions were made; the purpose of almost all of these revisions were to make the instructions clearer so as to avoid invalid responses.

One other revision to the materials was made based on the experience of the pilot test. The original version of the letter inviting pilot respondents to participate described the study as having, as its primary purpose, the examination of differences between African-Americans and Whites in attitudes and behaviors concerning breast cancer and mammography. Both the school principal (a White man) and the building representative (an African-American woman) said that describing the project as a study of racial differences would be a "red flag" that would raise bad feelings and discourage many potential respondents. Thus, we revised both the letter of invitation and the Consent Form to reduce the emphasis on racial differences, while remaining as honest as possible about the study and its purposes.

4. Selection of sample

The original goal of this study was to collect data from 1188 respondents, as follows:

- 297 African-American women aged 40-49
- 297 White women aged 40-49
- 297 African-American women aged 50-plus
- 297 White women aged 50-plus

We expected the PFT database to have information on members' age and ethnicity. This would have allowed us to get four lists of names, one for each of the cells described above, and select an equal number of individuals from each list. Our plan was to sample 400 from each list; with a response rate of 75%, this would have given us 300 respondents per cell.

In fact, the PFT database has information on age but not ethnicity; thus, it was not possible to select, a priori, equal numbers of African-Americans and Whites. The proportion of African-Americans among female PFT members is estimated at 37%. Thus, in each age group, in order to end up with at least 297 African-American respondents, we would need to obtain data from $(297 \times 1/0.37) = 803$ women. Assuming a response rate of 75%, the total number of women in each age group we would have to sample in order to end up with 803 respondents would be $(803 \times 1/0.75) = 1071$. Thus, rather than 1600 as originally planned, the total sample would have to be $(1071 \times 2) = 2142$.

Clearly, the procedure outlined above would result in a larger sample of Whites than originally intended. Because of this, the number of African-Americans needed to achieve the level of power stated in the proposal is somewhat less than originally calculated. This fact, plus financial considerations (see #7 below), led us to decide upon a sample size of roughly 2000 instead of 2142.

By coincidence, the numbers of women in the two age groups were virtually identical. (In fact, the younger group consisted of 3548 women, which was 355 more than the older group. Because the younger group is composed of women aged 40-49, approximately 10% of them should have been 49 when the list was produced. This happens to be exactly 355 women. Because the survey was mailed approximately six months after the list was produced, about half of these 355 women should have turned 50 in the interim. Thus, the two groups should indeed have been virtually identical in size at the time of the survey.) Because of this, we decided to select names at random from the entire list rather than stratifying by age. The random subsampling feature of the SPSS-PC software package was used to make the selection. Pilot respondents were excluded from the sample. We also decided to exclude certain categories of individuals who seemed likely either to: (a) be ineligible, (b) not respond, or (c) be left out of the comparison between African-Americans and Whites that is the central purpose of the study. The individuals thus excluded (totaling approximately five per cent of all individuals who had been randomly selected) were as follows:

- People whose first names seemed clearly male (e.g., Gary, Gerald);
- People whose first and last names seemed clearly Asian or Hispanic;
- People with no telephone number listed in the PFT database; and
- People who were not living in Pennsylvania, New Jersey, or Delaware.

After these exclusions, a total of 1996 women remained in the study sample.

5. Creation of database

The names, addresses, and telephone numbers of the 1996 women in the study sample were entered into a project database using Microsoft Access. Each woman was also assigned a four-digit study ID number. All information in the database was proofread for errors by checking it against the PFT list.

6. Hiring

In September 1997, Ann Marie Walsh Brennan was hired as Project Manager and Nancy Hodgson was hired as a Research Assistant.

7. Mailings

In early September 1997, letters were sent by the PFT to the 1996 women in the study sample (see #1 above). The School District also sent letters to the principals (see #2 above). Year 01 ended with the first mailing of survey packets about to take place.

The original Research Plan called for three mailings of survey packets. First, a packet would be mailed to everyone in the study sample. Then, after four weeks, a second packet would be mailed to everyone who had not yet responded. Finally, one week later, reminder calls would be placed to everyone who had still not responded, and a third packet would be sent to everyone who agreed to participate but had discarded their packet. It was expected that each mailing would consist of about half the number of pieces of the one before.

The larger-than-expected sample size (see #4 above) meant that the costs of copying and mailing the survey would be larger than expected as well. This problem was compounded by the fact that, due to an oversight, the budget for materials that appeared in the proposal was based on the assumption that the sample size would be 1000 rather than 1600. Thus, the budget allowed for the mailing of only $(1000 + 500 + 250) = 1750$ pieces. Because of this, we decided to eliminate the second mailing. That is, the revised procedure was as follows: Several weeks after the first mailing, reminder calls were placed to everyone who had not yet responded, and another packet was mailed to anyone who needed one.

One other revision was made to the procedure in order to reduce the cost of mailings. The original Consent Form stated that a copy of the form would be sent to everyone who returned a completed questionnaire. This, however, would have required a separate mailing. To avoid this, we decided to include a second copy of the Consent Form, for the respondent to keep, along with the survey questionnaire.

Year 02 Accomplishments

1. Mailing #1

Year 02 started with the first mailing of survey packets.

2. Hiring

A second research assistant, Jean Rodwell, was hired in late September.

3. Data clarification

All completed surveys were checked by the Project Manager as they came in. Participants who returned a survey questionnaire with any invalid, ambiguous, or missing response, or with no Consent Form, were contacted by telephone. They were asked to clarify obscure answers, supply incomplete information, and answer unanswered questions. Those who had not returned Consent Forms were asked if they actually wanted to participate and if they replied affirmatively, they were asked to return a second consent form which was subsequently mailed to them with a return postage envelope. To standardize the procedures for these calls, a manual was developed for the Research Assistants. This manual also covered the procedures for reminder calls and data entry and verification (see #4, 6, and 8 below).

4. Reminder call #1 and Mailing #2

As each completed survey came in, a note was made in the project database for that respondent. Approximately three weeks after the first mailing, the Research Assistants began making reminder calls to those individuals who had not yet returned survey questionnaires. The outcome of each call was recorded on a separate Reminder Call Log. A second survey packet was mailed to those women who did not refuse to participate but had misplaced their survey questionnaire. If any individual indicated that she was not interested in participating, a note was made in the project database.

5. Evaluation of phone numbers

PFT records were consulted to update obvious incorrect phone numbers where the telephone company supplied no new number, numbers which were fax machines, and numbers which were never answered. Even though we had access to the PFT's latest records, this update was only partially successful in that correct numbers were not obtained for all of the incorrect ones.

6. Reminder call #2 and Mailing #3

Approximately three months after the first reminder calls, second reminder calls were made to those women who had indicated in their first call that they would participate but had not yet returned a survey. Again, if the participant did not refuse but had misplaced the questionnaire, another survey packet was sent.

7. Determination of final disposition of sample

In July 1998, the final disposition for each of the 1996 women in the study sample was determined by examining the project database and the Reminder Call Logs.

8. Data entry and verification

A dataset was created using the SPSS-PC statistical package. The Research Assistants entered all survey participants' responses into this dataset. To eliminate data entry errors, all data were individually verified against the original questionnaires.

9. Data cleanup

A variety of data cleanup tasks were performed:

Checking odd responses. As an extra check on data entry errors, each variable in the verified dataset was examined for out-of-range or odd-looking values; such values were checked against the original questionnaires.

Open-ended responses. Several closed-ended variables were accompanied by open-ended items, mostly of the "other/specify" variety. The open-ended responses were examined, and where appropriate, changes were made to the closed-ended responses. As an example, item G1 asked respondents to indicate the highest degree completed. The response options were "Bachelor's," "Master's," "Doctorate," and "Other, specify." Numerous respondents checked "Other." When the open-ended responses were examined, it was found that almost all of these represented a master's degree plus extra credits. In such cases, the response to G1 was changed to "Master's."

Mean substitution in Section B. The items in Section B form a set of subscales. In a handful of cases, respondents had missing data on one of the items in a subscale. Missing values were replaced by the individual's mean score on the other items in the subscale, rounded to the nearest integer. One respondent had multiple items missing on two subscales; these responses were left as missing.

10. Creation of recoded and combined variables

The following variables were created by recoding or combining responses to individual survey items.

History of breast problems. Women who reported having had either breast cancer, or breast problems requiring either an office visit with a surgeon or other medical procedures, were counted as having a history of breast problems.

Perceived susceptibility to breast cancer. This scale was defined as the mean of responses to items B3, B8, B12, B16, and B22. The range of possible scores was 1.0 to 5.0.

Perceived seriousness of breast cancer. This scale was defined as the mean of responses to items B1, B6, B10, B14, B21, and B26 (range of possible scores = 1.0 to 5.0).

Perceived benefits of mammography. This scale was defined as the mean of responses to items B2, B4, B7, B11, B15, B17, B18, B20, B24, B25, B28, and B30 (range = 1.0 to 5.0).

Perceived barriers to mammography. This scale was defined as the mean of responses to items B5, B9, B13, B23, B27, and B32 (range = 1.0 to 5.0).

Problems with last mammogram. This scale was defined as the mean of responses to items C1 through C4. The range of possible scores was 1.0 to 4.0. Women who had never had a mammogram received missing data on this scale. (It should be noted that this variable does not represent "problems" in the sense of an abnormal mammogram result, but rather, adverse experiences such as inconvenience and anxiety.)

Normative influence to have a mammogram. To create this scale, responses to items E1, E2, and E3 were recoded to range from -2 ("strongly opposed") to +2 ("strongly in favor"), and responses to items E4, E5, and E6 were recoded to range from 0 ("not at all important") to 3 ("very important"). Responses of 9 ("I have no regular doctor") on items E1 and E4 were recoded to 0. Normative influence was then defined as $(E1 \times E4) + (E2 \times E5) + (E3 \times E6)$. Possible scores ranged from -6.0 to +6.0 (although, of course, almost all scores were positive).

History of breast cancer in 1st degree relatives. Women who reported that their mother, sister(s), or daughter(s) had had breast cancer were counted as having a history of breast cancer in first-degree relatives.

Receipt of reminder or recommendation. Women who said they had received a referral for a mammogram from either their primary care physician or OB/GYN in the previous 24 months, or had received any sort of reminder or recommendation to get a mammogram from any other health care provider in the same time period, were counted as having received a reminder or recommendation.

Guideline adherence over past 5 years. This dichotomous outcome variable represented whether the respondent reported having received at least the minimum number of mammograms in the

past five years to meet the guidelines for her age group. The guidelines for mammography have changed in the course of recent years; in particular, there has been debate over the guidelines for the age group 40-49. For our current purposes, we used the minimum guidelines that we felt women were most likely to have been aware of during the five-year period in question (roughly 1993-1997), i.e., that women aged 50 and over should have annual mammograms and that women aged 40-49 should have mammograms at least every other year. Thus, for example, if a respondent was 55 or over at the time of the survey, she would need to have had five mammograms in the previous five years to be counted as adherent on this variable. A respondent under 50, by contrast, would need to have had no more than two mammograms in the past five years to be counted as adherent; and so on.

Guideline adherence – most recent mammogram. This dichotomous outcome variable represented whether the respondent's most recent mammogram occurred within the guidelines for her age group.

Intention to have a mammogram within the next 24 months. This outcome variable comes from item H8, which was accompanied by a response scale ranging from 0 ("definitely will not") to 10 ("definitely will"). Because most respondents said "definitely will," the variable was dichotomized into "definitely will" vs. all other responses.

For each of the multi-item indices created, internal consistency reliability was determined using Cronbach's alpha coefficient. The alpha coefficients for each index are presented below. Internal consistency was highest for perceived susceptibility and perceived benefits, and was acceptable for perceived seriousness, normative influence, and perceived barriers. Internal consistency of the scale measuring problems with the most recent mammogram was low, but conceptually, this scale would not necessarily be expected to have high consistency, because different types of problems would not necessarily be expected to co-occur.

Psychometric Properties of Multi-Item Indices

Construct	Items	Alpha
Perceived susceptibility	B3, B8, B12, B16, B22	.91
Perceived seriousness	B11, B6, B10, B14, B19, B21, B26	.65
Perceived benefits	B2, B7, B11, B15, B20, B25, B4, B17, B18, B24, B28, B30	.75
Perceived barriers	B5, B9, B13, B23, B27, B29, B32	.58
Mammogram problems	C1, C2, C3, C4	.44
Normative influence	Doctor, Family, Friends	.64

11. Data analysis

Data analysis was carried out using the SPSS-PC statistical package. Results are reported in the next section.

B. Results

Descriptive Statistics

A total of 782 usable surveys were returned from the 1996 women in the sampling frame. Another 26 surveys were returned but could not be used. A total of 287 women refused to participate, and another 415 were "passive refusals" – that is, women who did not actually refuse but never returned a survey. Five women had moved out of the region after we received the PFT list, and were therefore treated as exclusions from the sampling frame (see "Selection of sample" under "Year 01 Accomplishments"); another three were deceased. For the remaining 478, we never made contact with the individual, and were therefore unable to determine whether she ever received the survey or not. (Note: For 22 of these 478 individuals, no final disposition was recorded, but it is almost certain that they were never contacted.)

The numbers and percentages of women in each category of final disposition are as follows:

Category	N	%
Questionnaires completed and entered	782	39
Passive refusal – we spoke to respondent; she did not refuse, but we never received a survey	415	21
Refused – we spoke to the respondent; she refused to participate	287	14
Couldn't contact – after multiple phone calls, we never spoke to an actual person and cannot tell whether the number we had was correct or not	253	13
Wrong number/no new number	203	10
Unknown nonrespondent – no survey, disposition unknown	22	1
Survey complete but no consent form returned	22	1
Moved out of region after phone numbers obtained	5	0.3
Completed survey but unusable	4	0.2
Deceased	3	0.2
Total	1996	100

Of the 782 women who returned usable surveys, 37 reported having had breast cancer, and another 16 did not identify themselves as either African-American or White. The responses of these women were excluded from the analyses. Thus, the final sample numbered 729.

Tables 1 through 5 show the descriptive statistics for the sample of 729 respondents. A total of 511 respondents (70.1%) were White; 218 (29.9%) were African-American. The mean age was 50.3 years; 57% were age 50 or under. Sixty-four percent were married or cohabiting; eighty-two percent had a master's degree, and 62% had annual family incomes of \$60,000 or more.

Approximately one-third of respondents had experienced breast problems, and five per cent had had some other form of cancer; seventy percent knew someone with breast cancer, but only 12% had a first degree relative with breast cancer. Adherence to mammography was high: Approximately three-quarters had been adherent to their age guidelines for the previous five years, 86% had had their most recent mammogram within guidelines, and 87% said they

definitely would get a mammogram in the next 24 months. Nearly all (94%) had received a reminder or recommendation to have a mammogram within the previous 24 months.

A substantial percentage of women reported one or more adverse experiences associated with their most recent mammogram. Twelve percent reported at least moderate inconvenience, 30% reported at least moderate anxiety, and 35% reported at least moderate physical discomfort.

Knowledge regarding breast cancer and mammography was high in this sample. Over ninety percent said that a woman can have breast cancer without symptoms, that mammography detects lumps that cannot be felt, and that women over 50 should have annual mammograms; 87% knew that most breast lumps turn out harmless.

Bivariate Comparisons by Race

Although Whites and African-Americans did not differ significantly in age or education, significant differences were found in marital status and income. White respondents were much more likely than African-Americans to be married or cohabiting (70.8% vs. 49.1%); not surprisingly, they were also more likely to have annual household incomes of \$60,000 or more (69.9% vs. 43.6%).

Whites and African-Americans differed significantly on a number of medical variables. White respondents were more likely than African-Americans to say that they knew someone with breast cancer (75.9% vs. 58.3%), but they were not significantly more likely to have a first-degree relative with breast cancer. White respondents were also more likely than African-Americans to have had some other form of cancer themselves, although the numbers were small in both groups (6.7% vs. 2.8%). With respect to health-related practices, White respondents were significantly less likely than African-Americans to be smokers (7.3% vs. 19.7%), and were more likely to have been adherent to mammography guidelines for the past five years (76.1% vs. 66.5%) and to state that they definitely would get a mammogram within the next 24 months (89.8% vs. 82.1%). They were not, however, significantly more likely than African-Americans to have had their most recent mammogram within the guidelines for their age group. African-American respondents were significantly more likely than Whites to have had three or more breast self-examinations in the previous three months (36.9% vs. 22.1%). White respondents were no more likely than African-Americans to have visited a primary care physician within the previous 24 months, but were significantly more likely to have visited an OB/GYN (90.6% vs. 80.6%). Both groups were equally likely to have received a reminder or recommendation to have a mammogram.

White respondents were more likely than African-Americans to report having had at least a little inconvenience associated with their most recent mammogram (55.3% vs. 42.2%), but the two groups did not differ significantly with respect to other specific categories of aversive experiences.

Although both groups scored high on the measures of knowledge related to breast cancer and mammography, White respondents were significantly more likely than African-Americans to

know that a woman can have breast cancer without symptoms (99.0% vs. 96.3%) and to say that a woman over 50 should have annual mammograms (95.7% vs. 89.9%).

With regard to health beliefs, White respondents scored higher than African-Americans on perceived susceptibility to breast cancer (2.49 vs. 2.26) and perceived seriousness of breast cancer (3.28 vs. 3.18), and lower on perceived barriers to mammography (1.52 vs. 1.73). On the composite score of problems with the most recent mammogram, White respondents scored higher than African-Americans (1.80 vs. 1.72); they also reported higher normative influence to have mammograms (4.17 vs. 3.83).

Bivariate Analyses of Outcomes

Variables significantly associated with adherence to mammography guidelines over the previous five years in the combined sample are presented in Tables 6 and 7. With respect to demographic characteristics, adherence rates were higher among respondents who were married or cohabiting, had high income, or had a master's degree or higher. As described in the previous section, adherence rates were significantly higher among Whites than among African-Americans. With respect to medical variables, adherence rates were higher among respondents who had had problems with their breasts, were nonsmokers, or had received a reminder or recommendation to have a mammogram in the previous 24 months. Respondents who said that a woman over 50 should have annual mammograms were also more likely to be adherent than respondents who did not. With respect to continuous variables, adherers scored significantly higher than nonadherers on perceived benefits of mammography, and lower on perceived barriers; they also scored higher on normative influence to have mammograms, and lower on problems with their most recent mammogram, than did nonadherers.

Variables significantly associated with having had one's most recent mammogram within guidelines are presented in Tables 8 and 9. With respect to demographic characteristics, adherence rates were higher among respondents who were married or cohabiting, or who had high income; educational level, however, was not significantly associated with this outcome measure. With respect to medical variables, adherence rates were higher among respondents who had had problems with their breasts, were nonsmokers, had received a reminder or recommendation to have a mammogram in the previous 24 months, or had a relative or friend with breast cancer. Respondents who said that a woman over 50 should have annual mammograms were also more likely to be adherent than respondents who did not. With respect to continuous variables, adherers scored significantly higher than nonadherers on perceived benefits of mammography, and lower on perceived barriers; they also scored higher on normative influence to have mammograms than did nonadherers.

Variables significantly associated with intentions to have a mammogram in the next 24 months are presented in Tables 10 and 11. With respect to demographic characteristics, intentions were higher among respondents who had high income, and as described in the previous section, intentions were higher among Whites than among African-Americans. With respect to medical variables, intentions were higher among respondents who had had problems with their breasts, were nonsmokers, had received a reminder or recommendation to have a mammogram in the previous 24 months, or had a relative or friend with breast cancer. Respondents who knew that a

woman can have breast cancer without symptoms, knew that mammograms can detect lumps that cannot be felt, or said that a woman over 50 should have annual mammograms also had higher intentions than respondents who did not. With respect to continuous variables, respondents who said they would definitely have a mammogram within the next 24 months scored significantly higher than other respondents on perceived susceptibility to breast cancer and perceived benefits of mammography, and lower on perceived barriers; they also scored lower on problems with their most recent mammogram, and higher on normative influence to have mammograms.

Multivariate Analyses of Outcomes

First-stage logistic regression models of the three outcome variables were estimated, using all variables shown in Tables 6 through 11 except race as potential predictors. A forward stepwise procedure was used to determine which variables would be included in the models. Tables 12 through 14 show the variables that entered into the models. As shown in Table 12, significant predictors of adherence to guidelines over the previous five years were a history of breast problems, educational level, income, having received a reminder or recommendation, perceived barriers, and problems with the most recent mammogram. As shown in Table 13, significant predictors of having had one's most recent mammogram within guidelines were smoking status, having received a reminder or recommendation, perceived barriers, and normative influence. As shown in Table 14, significant predictors of mammogram intentions were having a friend or relative with breast cancer, having received a reminder or recommendation, perceived susceptibility, perceived benefits, perceived barriers, problems with the most recent mammogram, and normative influence.

In the second stage of the multivariate analysis, the variables from each first-stage model were entered as a block into another logistic regression model, after which race was forced into the model. Race did not contribute significantly to any of the second-stage models ($p = .67$ for adherence to guidelines within the previous five years, $.56$ for having had one's most recent mammogram within guidelines, and $.90$ for mammogram intentions).

C. Conclusions

Even in a population of women selected to minimize ethnic differences in socioeconomic status, significant discrepancies between Whites and African-Americans were found. Most notably, African-American women tended to have lower annual family incomes than White women. The fact that African-Americans were also significantly less likely to be married than Whites presumably contributed to this discrepancy.

Although mammography adherence was high in both groups, African-American women were somewhat less likely than Whites to have adhered to age guidelines for mammography over the previous five years, and were less likely to say they definitely would get a mammogram in the next 24 months. In the multivariate analyses, however, race did not contribute significantly to the models of either mammography adherence or intentions. Consistent with the mammography literature in general, the single most consistent predictor of mammography outcomes was having received a reminder or referral. Demographic factors such as income and education,

interestingly, were not among the most important contributors. Health beliefs were predictive of outcomes, especially beliefs that acted as barriers to mammography, such as "Once you have a mammogram that turns out normal, you don't need to have any more" or "Mammograms have a high risk of leading to unnecessary surgery."

The analyses carried out so far do not answer the question of exactly what factors account for the observed difference in adherence rates between African-Americans and Whites. For example, is the difference due to access barriers such as income, or is it due to beliefs that reduce African-Americans' motivation to have mammograms? We plan to conduct further exploratory analyses to shed light on this issue.

D. Publications, Presentations, and Meeting Abstracts

No publications or presentations have yet resulted from this project. An abstract, "Ethnicity and Mammography among Public School Teachers" (Jepson C, Patterson E, Walsh-Brennan AM, Hodgson N), will appear in the abstract book of the Fifth Annual Scientific Symposium of the Center for Advancing Care in Serious Illness, University of Pennsylvania, Philadelphia, PA, March 1999.

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Table 1. Descriptive Statistics and Comparisons by Race -- Demographic Variables

Variable	Entire Sample		Whites		African-Americans		χ^2	p
	N	%	N	%	N	%		
Age group								
50 & under	418	57.3	299	58.5	119	54.6	0.96	.33
Over 50	311	42.7	212	41.5	99	45.4		
Marital status								
Married/cohabiting	469	64.3	362	70.8	107	49.1	31.60	<.0001
Widowed	29	4.0	16	3.1	13	6.0		
Divorced/separated/ never married	231	31.7	133	26.0	98	45.0		
Education								
Bachelor's	107	14.7	68	13.4	39	18.0	1.8	.17
Master's	600	82.6	428	84.1	172	79.3		
Doctorate	19	2.6	13	2.6	6	2.8		
Income								
Under \$40,000	39	5.4	21	4.1	18	8.3	40.16	<.0001
\$40 - \$59,000	237	32.6	132	25.9	105	48.2		
\$60,000 or more	451	62.0	356	69.9	95	43.6		

Table 2. Descriptive Statistics and Comparisons by Race -- Medical Variables

Variable	Entire Sample		Whites		African-Americans		χ^2	p
	N	%	N	%	N	%		
Breast problems	259	35.5	191	37.4	68	31.2	2.55	.11
Relative or friend with breast cancer	515	70.6	388	75.9	127	58.3	23.01	<.0001
First degree relative with breast cancer	87	11.9	66	12.9	21	9.6	1.6	.21
Other cancer in self	40	5.5	34	6.7	6	2.8	4.48	.03
Current smoker	80	11.0	37	7.3	43	19.7	24.28	<.0001
Adherent to mammography guidelines for past 5 years	525	73.2	382	76.1	143	66.5	7.05	.008
Adherent to guidelines for most recent mammogram	617	85.6	437	86.7	180	82.9	1.73	.19
"Definitely will" get mammogram within next 24 months	638	87.5	459	89.8	179	82.1	8.32	.004
Visited MD in past 24 months	655	89.8	456	89.2	199	91.3	0.70	.40
Visited OB/GYN in past 24 months	637	87.6	462	90.6	175	80.6	13.87	.0002
Received a reminder or referral for a mammogram	686	94.1	483	94.5	203	93.1	0.54	.46
Breast self-exams in past 3 months:							17.70	<.0001
Zero	206	28.3	159	31.1	47	21.7		
One	171	23.5	129	25.2	42	19.4		
Two	158	21.7	110	21.5	48	22.1		
Three or more	193	26.5	113	22.1	80	36.9		

Table 3. Descriptive Statistics and Comparisons by Race -- Experiences Associated with Mammography

Variable	Entire Sample		Whites		African-Americans		x ²	p
	N	%	N	%	N	%		
Inconvenience								
None at all	339	48.6	221	44.7	118	57.8	6.86	.009
A little	272	39.0	206	41.7	66	32.4		
Moderate	73	10.5	58	11.7	15	7.4		
A great deal	14	2.0	9	1.8	5	2.5		
Anxiety								
None at all	217	31.1	144	29.1	73	35.8	1.95	.16
A little	265	38.0	191	38.7	74	36.3		
Moderate	131	18.8	98	19.8	33	16.2		
A great deal	85	12.2	61	12.3	24	11.8		
Physical discomfort								
None at all	102	14.6	66	13.4	36	17.6	0.31	.58
A little	343	49.1	245	49.6	98	48.0		
Moderate	190	27.2	143	28.9	47	23.0		
A great deal	63	9.0	40	8.1	23	11.3		
Other problems								
None at all	694	99.4	491	99.4	203	99.5	0.16	.69
A little	0	0.0	0	0.0	0	0.0		
Moderate	2	0.3	1	0.2	1	0.5		
A great deal	2	0.3	2	0.4	0	0.0		

Table 4. Descriptive Statistics and Comparisons by Race -- Knowledge Related to Breast Cancer

Variable	Entire Sample		Whites		African-Americans		χ^2	p
	N	%	N	%	N	%		
Can have breast cancer without symptoms	715	98.2	506	99.0	209	96.3	6.4	.01
Most lumps turn out harmless	631	87.3	451	88.8	180	83.7	3.5	.06
A woman over 50 should have a mammogram once a year	685	94.0	489	95.7	196	89.9	9.02	.003
Mammography detects lumps that cannot be felt	708	97.3	497	97.5	211	96.8	0.25	.62

Note: N = Number of respondents giving an affirmative response

Table 5. Descriptive Statistics and Comparisons by Race -- Continuous Variables

Variable	Entire sample		Whites		African-Americans		t	p
	Mean	S. D.	Mean	S. D.	Mean	S. D.		
Perceived susceptibility to breast cancer	2.42	.814	2.49	.812	2.26	.799	3.54	<.001
Perceived seriousness of breast cancer	3.25	.615	3.28	.607	3.18	.629	2.12	.04
Perceived benefits of mammography	3.98	.485	3.99	.486	3.93	.481	1.62	.11
Perceived barriers to mammography	1.58	.495	1.52	.468	1.73	.525	-5.16	<.001
Problems with last mammogram	1.78	.458	1.80	.461	1.72	.446	2.12	.04
Normative influence to obtain mammography	4.07	1.40	4.17	1.301	3.83	1.588	2.77	.006

Table 6. Categorical Variables Significantly Associated with Adherence to Mammography Guidelines in Previous Five Years

Variable	Adherence rate*	X ²	p
Problems with breasts		17.55	<.0001
Yes	83%		
No	68%		
Received reminder		31.14	<.0001
Yes	75%		
No	34%		
Knowledge re: frequency		7.07	.008
Yes	74%		
No	56%		
Married/cohabiting		9.13	.003
Yes	77%		
No	67%		
Income		16.56	.00005
Under \$40,000	60%		
\$40 - \$59,999	66%		
\$60,000 - plus	79%		
Education		5.59	.02
Bachelor's	63%		
Master's	75%		
Doctorate	79%		
Smokes cigarettes		5.57	.02
Yes	62%		
No	75%		
Race		7.05	.008
White	76%		
African-American	66%		

* Figures are percentages of respondents whose mammogram adherence in the past five years matched or exceeded the guidelines for their age. Respondents with missing data on the given characteristic were excluded from calculation of percentages.

Table 7. Continuous Variables Significantly Associated with Adherence to Mammography Guidelines in Previous Five Years

Variable	Mean (S.D.) among:				t	p
	Adherers		Nonadherers			
Perceived benefits	4.01	(0.46)	3.90	(0.54)	2.69	.007
Perceived barriers	1.50	(0.42)	1.81	(0.61)	7.55	.000
Problems with last mammogram	1.75	(0.45)	1.87	(0.46)	3.12	.002
Normative influence	4.23	(1.28)	3.65	(1.65)	4.42	.000

Table 8. Categorical Variables Significantly Associated with Timing of Most Recent Mammogram

Variable	Adherence rate*	X ²	P
Problems with breasts		6.15	.02
Yes	90%		
No	83%		
Knowledge re: frequency		9.26	.003
Yes	87%		
No	70%		
Married/ cohabiting		7.80	.006
Yes	88%		
No	81%		
Income		6.93	.009
Under \$40,000	82%		
\$40 - \$59,999	81%		
\$60,000 – plus	88%		
Received reminder		71.26	<.0001
Yes	88%		
No	40%		
Relative/friend with breast Cancer		4.13	.04
Yes	87%		
No	81%		
Smokes cigarettes		12.41	.0005
Yes	72%		
No	87%		

* Figures are percentages of respondents whose most recent mammogram was within the guidelines for their age. Respondents with missing data on the given characteristic were excluded from calculation of percentages.

Table 9. Continuous Variables Significantly Associated with Timing of Most Recent Mammogram

Variable	Mean (S.D.) among:				t	p
	Adherers		Nonadherers			
Perceived benefits	4.00	(0.47)	3.86	(0.56)	2.72	.01
Perceived barriers	1.53	(0.46)	1.85	(0.62)	5.01	.000
Normative influence	4.20	(1.32)	3.32	(1.66)	5.14	.000

Table 10. Categorical Variables Significantly Associated with Intentions to Obtain Mammogram

Variable	Adherence rate*	X ²	P
Breast problems		3.80	.05
Yes	91%		
No	86%		
Belief: breast cancer asymptomatic		4.04	.04
Yes	88%		
No	69%		
Received reminder		62.58	<.0001
Yes	90%		
No	49%		
Knowledge re: frequency		29.32	<.0001
Yes	89%		
No	61%		
Belief: mammograms detect lumps not palpable		5.76	.02
Yes	88%		
No	70%		
Breast cancer in 1 st degree relative		5.62	.02
Yes	95%		
No	86%		
Relative/friend with breast cancer		16.06	<.0001
Yes	91%		
No	80%		
Smokes cigarettes		6.29	.012
Yes	79%		
No	89%		
Income		8.62	.003
Under \$40,000	72%		
\$40 - \$59,999	86%		
\$60,000 - plus	90%		
Race		8.32	.004
White	90%		
African-American	82%		

* Figures are percentages of respondents who said they definitely intended to have a mammogram in the next 24 months. Respondents with missing data on the given characteristic were excluded from calculation of percentages.

Table 11. Continuous Variables Significantly Associated with Intentions to Obtain Mammogram

Variable	Mean (S.D.) among:				t	p
	Definitely will		All others			
Perceived susceptibility	2.47	(0.81)	2.08	(0.75)	4.36	.000
Perceived benefits	4.01	(0.46)	3.69	(0.58)	5.02	.000
Perceived barriers	1.53	(0.46)	1.94	(0.59)	6.26	.000
Problems with last mammogram	1.76	(0.45)	1.89	(0.54)	1.94	.056
Normative influence	4.23	(1.30)	2.95	(1.61)	7.28	.000

Table 12. Variables in Logistic Regression Model of Adherence to Mammography Guidelines in Previous Five Years

Variable	B	p
History of breast problems	-.7709	.0003
Educational level	.4651	.04
Income	.3399	.03
Reminder/recommendation	1.5083	.0002
Perceived barriers	-.8050	<.0001
Problems with most recent mammogram	-.6692	.001

Table 13. Variables in Logistic Regression Model of Timing of Most Recent Mammogram

Variable	B	p
Smoking status	-.7450	.0162
Reminder/recommendation	2.1164	<.0001
Perceived barriers	-.9076	<.0001
Normative influence	.2494	.002

Table 14. Variables in Logistic Regression Model of Mammogram Intentions

Variable	B	p
Relative/friend with breast cancer	.6501	.03
Reminder/recommendation	2.1416	<.0001
Perceived susceptibility	.7919	.0001
Perceived benefits	.8398	.007
Perceived barriers	-.7568	.009
Problems with most recent mammogram	-.9913	.001
Normative influence	.3814	.0001

October 3, 1997

«FirstName» «LastName»
«Address»
«City», «State» «PostalCode»


Dear Ms. «LastName»:

We would like to ask you to participate in a brief survey of attitudes and behaviors concerning mammography among female public school teachers in the Philadelphia School District. Our primary goal is to examine the effect of factors such as age, ethnicity, and access to care on these attitudes and behaviors. We have chosen the public school teachers of Philadelphia to be our respondents because you represent a population in which other factors, such as income, education, and place of residence, are relatively constant; this makes it easier to assess the role of the factors we have chosen to examine.

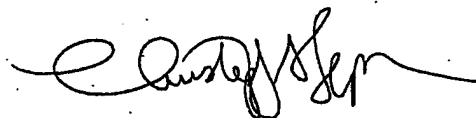
Based on pretests, we expect that the survey should take, on the average, between 10 and 20 minutes to complete. Your responses will remain completely confidential, and we will not give out our mailing lists to any outside organization. Please read and sign the Consent Form that is attached to the enclosed survey, and return it, along with the completed survey, to us by October 21 in the postage-paid envelope provided.

We understand that you are very busy at this time of the year and we greatly appreciate your taking time out to help us. Our ability to draw valid conclusions from our data depends critically upon receiving responses from as many of the individuals we invite as possible. Thus, the information you provide will be essential to the success of this project. Thank you very much.

Sincerely,



Elizabeth Patterson, MD
Assistant Professor of Radiology
School of Medicine



Christopher Jepson, PhD
Research Assistant Professor
School of Nursing

Consent Form

***** Please read and sign this form before filling out the survey. *****

Title of study: Philadelphia Teachers' Mammography Survey

Location: University of Pennsylvania Medical Center
Philadelphia, PA

Principal Investigator: Elizabeth A. Patterson, M.D. (215) 662-6726
Assistant Professor
Department of Radiology
University of Pennsylvania Medical Center
Philadelphia, PA 19104

Co-Principal Investigator: Christopher Jepson, Ph.D.
Research Assistant Professor
University of Pennsylvania School of Nursing

Funding Agency: U. S. Army Medical Research and Materiel Command

This study is a survey of female teachers aged 40 and older in the Philadelphia School District. The main purpose is to look at women of comparable residence, education, and income, and see if there are any differences between them in their knowledge, beliefs, attitudes, and behaviors regarding mammography as a function of other factors such as age, ethnicity, and access to care.

In this study, we ask you to fill out a questionnaire and mail it back to us, along with this consent form signed by you, in a postage-paid envelope that we provide. We expect that the questionnaire will take, on the average, between 10 and 20 minutes to fill out. Your name will not appear anywhere on the questionnaire and your answers will be kept completely confidential. We have tried to avoid asking any particularly personal or sensitive questions, but you are free to choose not to answer any question if you do not want to. No one who is not on the staff of this research project will ever see any of your answers. A second copy of this consent form is enclosed for your records.

One of the questions we ask is where and when you had your last mammogram (if you have ever had one). For some women in this study, we will be checking medical records to see if their answers to this question are accurate. When we check the medical records, we will look only at the date of the mammogram; we will not look at the result or any other information.

If we have any questions about any of your answers on the questionnaire, we may call you in order to make sure we understand correctly.

Your participation in this study is voluntary. There is no penalty if you refuse to participate, and you may discontinue participation at any time.

(Continued on back)

(The following statement is required by law.) You are authorized all necessary medical care for injury or disease which is the proximate result of your participation in this research. The U.S. Army requires that this institution provide such medical care when conducting research with private citizens. Other than medical care that may be provided (and any other remuneration specifically stated in this consent form), there is no other compensation available for your participation in this research study; however, you understand that this is not a waiver or release of your legal rights.

If you have any questions about this study, please contact Dr. Patterson at the address and telephone number listed at the top of this sheet. If you have questions about research subjects' rights, please contact the Executive Director of the University of Pennsylvania Office of Research Administration at (215) 898-7293.

If you agree to participate in this study, please **print** your name and permanent address, and sign your name, in the spaces below, and please have a witness do the same.

Your name/address (please print):

Name/address of witness (please print):

Your signature:

Signature of witness:

***** Please be sure to return this form along with the survey. *****

Philadelphia Teachers' Mammography Survey

A1. Have you ever had breast cancer? 1 [] Yes 2 [] No

(If you answered yes, please skip to Section C on page 3.)

A2. Have you ever had any problems with 1 [] Yes 2 [] No
your breasts?

(If yes:) Did any of these problems require ...

a. An office visit with a surgeon? 1 [] Yes 2 [] No

b. Other medical procedures 1 [] Yes 2 [] No
(ultrasound, etc.)?

Please indicate how much you agree or disagree with the following statements, on a scale of 1 to 5, where 1 means you strongly *disagree* and 5 means you strongly *agree*.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
B1. The thought of breast cancer scares me.	1	2	3	4	5
B2. Having a recommended mammogram will make me feel good about myself.	1	2	3	4	5
B3. It is extremely likely that I will get breast cancer in the future.	1	2	3	4	5
B4. Breast cancer can be cured if found early enough.	1	2	3	4	5
B5. If I eat a healthy diet, I probably do not need to have a mammogram.	1	2	3	4	5
B6. When I think about breast cancer, my heart beats faster.	1	2	3	4	5
B7. Once I get a mammogram, I won't worry as much about breast cancer.	1	2	3	4	5
B8. I feel I will get breast cancer in the future.	1	2	3	4	5
B9. Mammograms have a high risk of leading to unnecessary surgery.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
B10. I am afraid to think about breast cancer.	1	2	3	4	5
B11. Having a mammogram will help me find lumps early.	1	2	3	4	5
B12. There is a good possibility I will get breast cancer in the next ten years.	1	2	3	4	5
B13. Once you have one mammogram that turns out normal, you don't need to have any more.	1	2	3	4	5
B14. Problems I would experience with breast cancer would last a long time.	1	2	3	4	5
B15. Having a mammogram will decrease my chances of dying from breast cancer.	1	2	3	4	5
B16. My chances of getting breast cancer are great.	1	2	3	4	5
B17. Getting regular mammograms will give me peace of mind.	1	2	3	4	5
B18. Getting a mammogram is one of the most important things a woman can do to keep herself healthy.	1	2	3	4	5
B19. Breast cancer would threaten a relationship with my boyfriend, husband, or partner.	1	2	3	4	5
B20. Having a mammogram will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs.	1	2	3	4	5
B21. If I had breast cancer my whole life would change.	1	2	3	4	5
B22. I am more likely than the average woman to get breast cancer.	1	2	3	4	5
B23. A woman doesn't need a mammogram unless she has a lump or some other symptom.	1	2	3	4	5
B24. Mammograms are harmless.	1	2	3	4	5
B25. Having a mammogram will help me find a lump before it can be felt by myself or a health professional.	1	2	3	4	5

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
B26. If I developed breast cancer, I would not live longer than five years.	1	2	3	4	5
B27. I'd rather not think about getting a mammogram.	1	2	3	4	5
B28. Mammograms are beneficial even when there is no history of breast problems in a family.	1	2	3	4	5
B29. If I had a mammogram I would feel worried or anxious while waiting for the results.	1	2	3	4	5
B30. If I had a mammogram I would feel reassured once I learned the results were normal.	1	2	3	4	5
B31. If I take care of myself, I can reduce my chances of getting breast cancer.	1	2	3	4	5
B32. There is little I can do to reduce my chance of dying of breast cancer.	1	2	3	4	5

* * * * *

For this next set of questions, think about the most recent mammogram you have had, and rate the extent to which you experienced each of the following things. If you have never had a mammogram, put a check mark here [] and skip to **section D** on the next page.

	None at all	A little	Moderate	A great deal
C1. Inconvenience:	1	2	3	4
C2. Anxiety:	1	2	3	4
C3. Physical discomfort:	1	2	3	4
C4. Other problems:	1	2	3	4

(If none, circle 1. Otherwise, specify problem below and rate it.)

If you have had a mammogram in the last 24 months,
please put a check mark here [] and skip to section E on the next page.

If you have not had a mammogram in the last 24 months,
please answer the following questions.

Here are some statements about things that might keep women from getting a mammogram. For each one, please indicate how true that statement is of you — not at all, a little, somewhat, or very much. Please give a rating for each statement.

I haven't had a mammogram in the last 24 months because ...

	Not at all	A little	Somewhat	Very much
D1. I've simply never thought about it until now.	1	2	3	4
D2. I'd be embarrassed about getting one.	1	2	3	4
D3. It would make me worry about breast cancer.	1	2	3	4
D4. It's too much trouble; I don't have the time for one.	1	2	3	4
D5. I'd rather not think about it.	1	2	3	4
D6. I'm concerned about the radiation from mammograms.	1	2	3	4
D7. Mammograms cost too much.	1	2	3	4
D8. Getting a mammogram would be inconvenient.	1	2	3	4
D9. Getting a mammogram would be painful.	1	2	3	4
D10. Any other reason? <i>(If none, circle 1. Otherwise, specify the reason below and give a rating.)</i>	1	2	3	4

E1. How do you think your regular doctor feels about you getting a mammogram?

1	2	3	4	5	9
Strongly opposed	Mildly opposed	Neutral	Mildly in favor	Strongly in favor	I have no regular doctor

E2. How about your family members?

1	2	3	4	5
Strongly opposed	Mildly opposed	Neutral	Mildly in favor	Strongly in favor

E3. How about your friends?

1	2	3	4	5
Strongly opposed	Mildly opposed	Neutral	Mildly in favor	Strongly in favor

E4. How important is it to you to do what your regular doctor thinks you should do?

1	2	3	4	9
Not at all important	Not very important	Somewhat important	Very important	I have no regular doctor

E5. How important is it to you to do what your family members think you should do?

1	2	3	4
Not at all important	Not very important	Somewhat important	Very important

E6. How important is it to you to do what your friends think you should do?

1	2	3	4
Not at all important	Not very important	Somewhat important	Very important

F1. Could a woman have breast cancer without having any symptoms or feeling ill?

1 ☐ Yes 2 ☐ No

F2. Most lumps in the breast turn out to be harmless -- true or false?

1 ☐ True 2 ☐ False

F3. If a woman aged 50 or older does not have any breast problems or symptoms, how often should she get a mammogram?

1 ☐ Never
2 ☐ Less often than once a year
3 ☐ Once a year
4 ☐ More often than once a year

F4. Mammography can detect lumps in the breast that can't be felt -- true or false?

1 ☐ True 2 ☐ False

* * * * *

G1. Please check the highest degree you have completed:

1 ☐ Bachelor's 2 ☐ Master's
3 ☐ Doctorate 9 ☐ Other, specify: _____

G2. What is your age? _____

G3. What is your current marital status?
(Check one)

1 ☐ Married or living as married
2 ☐ Widowed
3 ☐ Divorced, separated, or never married

G4. Of the following income groups, which one would you say comes closest to your family's total combined income from all sources, before taxes, in the past 12 months? *(This information is requested for research purposes only and will be kept anonymous.)*

1 ☐ Under \$40,000
2 ☐ \$40 - \$59,999
3 ☐ \$60,000 or more

G5. What is your current employment status as a teacher?

1 ☐ Active 2 ☐ Retired

G6. What is your ethnicity?

- 1 ☐ White 2 ☐ Black/African-American
3 ☐ Hispanic 4 ☐ Asian/Pacific Islander
9 ☐ Other (please specify): _____

* * * * *

H1. Has anyone close to you ever had breast cancer? (Check all that apply)

- 1 ☐ No one 1 ☐ Mother
1 ☐ Sister(s) 1 ☐ Daughter(s)
1 ☐ Other relative(s) 1 ☐ Friend(s)

H2. Have you yourself ever had any kind of cancer other than breast cancer?

- 1
- ☐
- Yes 2
- ☐
- No

(If yes:) What kind? _____

H3. Do you currently smoke cigarettes?

- 1
- ☐
- Yes 2
- ☐
- No

H4. How many times during the past three months have you practiced breast self-examination?

- ☐ 0 ☐ 1 ☐ 2 ☐ 3 or more

H5. In how many of the past five years have you had a mammogram? (Check one)

- 0 ☐ None 3 ☐ 3 of the 5 years
1 ☐ 1 of the 5 years 4 ☐ 4 of the 5 years
2 ☐ 2 of the 5 years 5 ☐ All 5 years

H6. How long ago was your most recent mammogram?

- 1 ☐ I have never had one --> (Skip to H-8)
2 ☐ More than 24 months ago
3 ☐ 13 to 24 months ago
4 ☐ Less than 13 months ago

H7. Where did you have your most recent mammogram?

H8. How likely do you think you are to get a mammogram in the next 24 months, on a scale of 1 to 10, where 1 means you definitely will not get one and 10 means you definitely will?

1	2	3	4	5	6	7	8	9	10
Definitely <u>will not</u>									Definitely <u>will</u>

H9. How long ago was your most recent breast examination by a health professional?

- 1 ☐ I have never had one
- 2 ☐ More than 24 months ago
- 3 ☐ 13 to 24 months ago
- 4 ☐ Less than 13 months ago

H10. Have you visited your family doctor or primary care physician in the past 24 months for any reason?

- 1 ☐ Yes
- 2 ☐ No (if no, skip to H-11)

(If yes:) Has he/she given you a referral for a mammogram in the past 24 months?

- 1 ☐ Yes
- 2 ☐ No

H11. Have you visited an OB/GYN in the past 24 months for any reason?

- 1 ☐ Yes
- 2 ☐ No (if no, skip to H-12)

(If yes:) Has he/she given you a referral for a mammogram in the past 24 months?

- 1 ☐ Yes
- 2 ☐ No

H12. In the past 24 months, did you receive any sort of reminder or recommendation to get a mammogram from any other health care provider?

- 1 ☐ Yes
- 2 ☐ No

Thank you very much for your participation!